REMARKS

The present claim amendments are responsive to the Examiner's concerns noted in the Office Action.

Summary of the Response

Claims 96, 136-140, 142 and 143 have been amended. Claim 105 has been previously canceled. Claims 99-102, 114, 117-129 and 135 have been previously withdrawn. Claims 96-104, 106-145 remain pending in the present application. Reexamination and reconsideration of the present application as amended are respectfully requested.

Claim Objections

Claim 137 has been amended to correct the informalities noted by the Examiner.

Claim Rejections

Claims 96-98, 104, 106-113, 115, 116, 130-132, 134, 136-141 and 143-145 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grabbe (6,695,488) in view of Lessar et al. (5,902,326, cited in previous office action). Claim 133 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grabbe in view of Lessar et al as applied to claims 96, 131 and 132 above, and further in view of Gilliland et al (6,283,644). Claim 103 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grabbe in view of Lessar et al as applied to claim 96 above, and further in view of Karlovich (5,037,328, cited in previous office action). Claim 142 is

rejected under 35 U.S.C. 102(e) as being anticipated by Grabbe. These rejections are respectfully traversed.

On the outset, Applicant notes that the publication date of the primary reference Grabbe is after the effective filing date of the present application. Applicant may be entitled to submit a declaration to "swear behind" Grabbe. Given the traversal of the rejections below, Applicant has not yet considered such option, but reserves the right to do so at a later date should the need arise.

a. Claim Rejections Under 35 USC 103

The Examiner acknowledged that Grabbe fails to disclose ferrules formed by a stamping process. However, the Examiner looked to Lessar for such teaching. Applicants respectfully submit that there is no motivation to one of ordinary skill in the art to combine the teachings of Grabbe and Lessar, for at least the reasons discussed below.

Lessar is not in the same field of endeavor as Grabbe. Grabbe relates to the field of **multi fiber optical ferrule for use in coupling fibers in optical data networks**. Lessar however relates to an **optical window assembly for use in implantable medical devices**. Lessar is therefore from a very different technical field than the optical ferrule field of Grabbe and the optoelectronic connector field of the present invention. Lessar is thus **non-analogous art**.

Further, Applicant respectfully submits that Grabbe and Lessar should not have been combined in the first place to render the claimed invention obvious, since such combination would not have been obvious to a person skilled in the art. Grabbe is directed to optical ferrules for the specific purpose of deployment in optical data networks. Lessar on the other hand is directed to the structure of an optical window for implantable medical devices. It is clear that

neither Grabbe nor Lessar contain any suggestion (express or implied) that they be combined, or that they be combined in any specific manner to obtain the claimed invention, certainly not in the manner suggested only by the Examiner (which can only be made possible with the benefit of hindsight reconstruction given the disclosure of the present invention).

Grabbe is complete and functional in itself, so there would be no reason, and in fact no reason has been stated in Grabbe, to modify its specific teaching of machining ferrules for **multi fibers** with the stamping process of Lessar. Grabbe does not contain any expressed or implied suggestion that its ferrule machining can and should be modified to ferrule stamping to obtain **multi fiber ferrules**. Grabbe recognizes that it is important to assure accuracy in the structure of its ferrules. According to the Abstract in Grabbe: "The **multi fiber optical ferrule** is formed of two ferrule halves which are either molded or cast as imprecise blank which are **machined** using a broach in order to precisely cut inner surfaces thereof for receiving an array of fibers. The inner surfaces of a pair of ferrule halves are cut **simultaneously** in order to assure accuracy in the fiber receiving and pin receiving channels." Grabbe elaborates its specific machining process: "The [ferrule] halves are **machined** by a skiving or broaching method utilizing a broach tool. The broach has an exposed cutting edge for broaching the inner contour of each ferrule half. The ferrule halves are preferably identical having inner face which are a mirror image of each other. The inner surfaces and channels are **machined with the same tool**, assuring coaxiality of mating fibers with an error only due to uncertainty of fiber core to fiber outer diameter relationship." Accordingly, Grabbe meets its objective of assuring coaxiality of mating fibers, and specifically **multi fibers**, by specifically requiring **machining** identical ferrule halves simultaneously using the same tool. There is no indication anywhere in Grabbe that stamping may be adequately substituted for machining and yet be able to obtain optical ferrule halves that

can achieve alignment accuracy for multi fibers. Grabbe does not include any hint or suggestion to refer to another reference for guidance on substituting its machining with stamping. There is therefore no teaching or suggestion (expressed or implied), taking into account only knowledge which was with the level of ordinary skill at the time the invention was made, if and how Grabbe could be modified by any reference on stamping, much less Lessar, while maintaining the type of optical ferrule that Grabbe proposes. Such modification is only possible with impermissible hindsight reconstructions, made possible only by the disclosure of the present invention. Grabbe therefore effectively teaches away expressly, or at least by implication, from stamping ferrule halves suggested only by the Examiner by hindsight reconstruction after gleaming the disclosure of the present invention.

Further, Lessar does not make up for the deficiencies of Grabbe. The stamping referenced in Lessar would not be suitable for Grabbe. Lessar does not disclose ferrules that support optical fibers, which are formed by a stamping process, and further ferrules halves formed by stamping. Instead, Lessar tangentially referred to stamping of a flat circular ferrule 20 to hold a single lens 30. It does not appear that the lens holding ferrule is intended to be manufactured to have the kind of tolerance required for optical fiber couplings as in Grabbe and the present invention, regardless of the specific manufacturing process. This point is particularly clear based on the fact the ferrule 20 is designed with a stress relief structure, and in particular a U-shaped strain relief channel 22 along the perimeter of the ferrule body. With such U-shaped channel structure, the ferrule 20 can "give" to some extent to reduce residual stress against the surrounding structure. This is the specific intent of the invention disclosed in Lessar. However, for optical coupling of optical fibers, such strain relief in the supporting ferrule would create unacceptable tolerances, resulting in misalignment of the fibers. Such concerns would outweigh

any economical advantage associated with stamping process manufacturing in general. It is therefore abundantly clear that Lessar does not teach using stamping process to form extremely high tolerance optical couplings for optical fibers. One of ordinary skill in the art therefore would not have looked to Lessar for guidance in the manufacturing of optical coupling for fibers. and specifically teaching of stamping optical ferrule halves for use in optical data network, much less multi fiber ferrules in Grabbe.

Further, even if one were to refer to Lessar in hope of such guidance, Lessar simply does not contain an enabling disclosure of forming using a stamping process optical fiber supporting ferrules in an optical coupling, and further ones for multi fibers as in Grabbe. Lessar does not contain any enabling disclosure of stamping ferrule halves with the level of positional accuracy required for aligning fibers to reduce optical coupling loss in an optical data network (see also background discussion in Grabbe, at col. 1, lines 46+). The Lessar optical window assembly does not require the level of accuracy required by the optical ferrule of Grabbe (and specifically a multi fiber ferrule), or the optoelectronic connector of the present invention.

In examining the present application, the Examiner should keep in mind the context in which the claimed optical coupling of the present invention is structured for use in optoelectronic applications. By way of background, for optoelectronic applications, components such as connectors for aligning optic fibers (e.g., on the order of 0.125mm in diameter) require a high manufacturing tolerance, such as within 1000nm to be useful. Some of the optoelectronic components are made out of molded plastic or polymer material, with less than desirable tolerance. In the past, in an attempt to offset for the large manufacturing tolerances, many optoelectronic components are designed with relatively complex structures (e.g., alignment means, biasing means, etc.) that require higher manufacturing costs and relatively complicated

assembly procedures for a user in the field. Alternatively, the prior art optoelectronic components are manufactured using precision systems and processes that are relatively complex and costly to achieve the desired manufacturing tolerances. For example, components were made by reactive ion-etching silicon wafers.

Until the creation of the present invention, none of the prior art optoelectronic components has been successfully manufactured by means of stamping processes to achieve the desired tolerances, and which can be easily deployed in the field by a user. The failure of the prior art to achieve such tolerance is due to not only the absence of a viable high tolerance stamping system and process, but also the failure of viable component structures that can be manufactured by stamping systems and processes, and that can be easily deployed by a user in the field.

The present invention is directed to optoelectronic components (e.g., assemblies and sub-assemblies), in particular an optical coupling having structures that lend themselves to be manufactured by high-speed stamping systems and processes, such as the novel stamping system and process disclosed in Applicant's co-pending U.S. patent application no. 10/620,851, which is capable of stamping optoelectronic components having tolerances of 1,000 nm or less, required by many optoelectronic applications. The inventive optoelectronic components include optical fiber connectors, including precision ferrules in association with alignment sleeves. Either or both ferrules and sleeves may be stamped from metal.

Accordingly, in examining the present application, the Examiner should keep in mind the context of high tolerance parts required for aligning optical fibers, as achieved by the present invention. The results achieved by the invention are new, unexpected, superior, critical, and unsuggested by any prior art. The present invention provides an enabling solution to a long felt,

long-existing, but unresolved need, achieving advantages beyond what the prior art has to offer, and has attained commercial success. The accomplishments of the inventors of the present invention involve no small steps. (However, even if the steps taken by the inventors is deemed to be small, the invention is classified in a crowded art; therefore even if a "small" step forward should be regarded as significant.) If the present invention were in fact obvious, because of its advantages, those skilled in the art surely would have implemented it by now. That is, the fact that those skilled in the art have not implemented the invention, despite its great advantages, indicates that the combination suggested in the Office Action would not have been obvious.

Grabbe and Lessar take mutually exclusive paths and reach different solutions to different problems that the respective references address. Grabbe requires alignment of optical fibers using optical ferrules comprising machined ferrule halves, using guide pins to position two ferrules to achieve alignment tolerance. Lessar on the other hand requires strain relief to reduce residual stress in the lens mount, which effectively results in a structure with a significantly lower tolerance. Consequently, they effectively teach away from each other (expressly or by implication). Therefore it would not be logical to combine them.

Accordingly, one skill in the art would not have looked to Lessar to find the solutions that could overcome the drawbacks of the prior art, which solutions are found only by the inventors of the present invention. In any attempt to achieve the present invention, it would be necessary to make modifications, not taught or rendered obvious by the prior art, in order to combine the references in the manner suggested only by the Examiner.

Further, the fact that Grabbe does not teach ferrules formed by a stamping process is not its only deficiency. Grabbe also does not teach ferrule halves received by an **alignment sleeve** to couple the ferrule halves in an end-to-end manner to align the fibers. Instead, Grabbe

specifically requires the use of **alignment pins** to align ends of fibers supported in ferrules. Given the alignment pins, Grabbe in fact teaches away from using alignment sleeves. Applicant submits that sleeve guided ferrules achieve a higher tolerance than pin guided ferrules, which sleeve guided structure is specifically avoided by Grabbe.

Applicant notes that the sleeve 32 in Grabble is **not a sleeve that is structured to align fibers held by two ferrules**, but is used only to **fasten two ferrule halves** in place. This is clear from a reasonable reading of Grabbe. Referring to Fig. 9 and col. 4, lines 14+: "A front sleeve 32 is preferably placed over ferrule 10 from the mating face 18 and a rear sleeve 34 is place over the ferrule 10 from the cable receiving end 16 as indicated by the arrows in FIG. 6. Metal sleeves (not shown) may be inserted in the pin receiving channels 24 to surround the pins. The mating surface is **then polished** according to techniques known in the art." From a fair reading of this section, the sleeve 32 cannot extend beyond the end/mating surface 18 of the ferrule, as the mating surface is to be polished **after** the sleeve 32 is placed over the ferrule 10. Grabbe therefore expressly, or at least by implication, teaches away from coupling ferrules using sleeves. While Applicant does not feel that it is necessary, however in the interest to forwarding the present application to early allowance without further delays, the relevant independent claims have been amended to recite that the sleeve extends beyond an end of the ferrule, to more clearly distinguish from Grabbe.

Given the foregoing, even if Grabbe and Lessar can somehow be combined, such combination would not result in an enabling disclosure of an optical coupling comprising ferrules formed by a stamping process, as required by the independent claims in the present application. Even if the references can somehow be combined, it would be necessary to make

modifications, not taught in the prior art, in order to combine the documents to obtain the claimed invention.

In summary, Grabbe and Lessar do not render obvious ferrules comprising stamped ferrule halves, and/or stamped sleeves for aligning the ferrule to another component (e.g., a connection device, another ferrule, etc.). Applicant respectfully requests the Examiner to reference specific sections in the cited documents to support any conclusion that the present invention as defined by all the independent claims are rendered obvious by Grabbe and Lessar. All the independent claims, and all claims dependent therefrom, are not rendered obvious by Grabbe and Lessar.

The rejections based on further secondary references Gilliland and Karlovich are likely traversed. Neither Gilliland nor Karlovich makes up for the deficiencies of Grabbe and Lessar. There is no motivation to combine these references in the first place.

b. Claim Rejection Under 35 USC 102

Claim 142 has been rejected as being anticipated by Grabbe. As noted above, Grabbe does not teach a sleeve sized and shaped to extend beyond an end of the ferrule to couple to the connection device. Claim 142 is not anticipated by Grabbe.

CONCLUSION

In view of all the foregoing, Applicant submits that the claims pending in this application are patentable over the references of record and are in condition for allowance. Such action at an early date is earnestly solicited. **The Examiner is invited to call the undersigned representative to discuss any outstanding issues that may not have been adequately addressed in this response.**

Respectfully submitted,

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